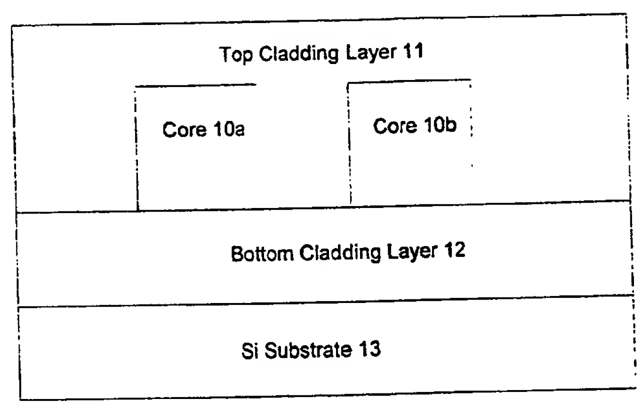


FIG. 1
(Prior Art)

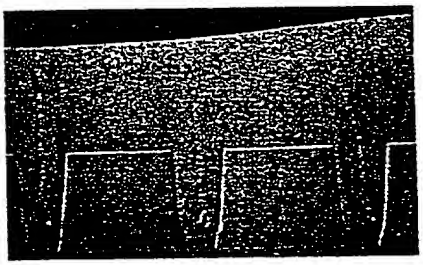


Fig 2 (a) BPSG 2um gap

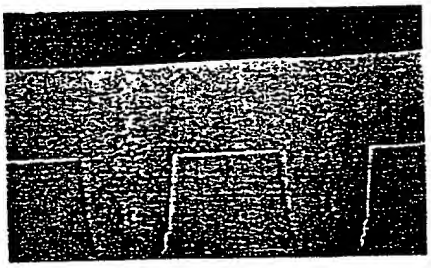


Fig 2 (b) BPSG 4um gap

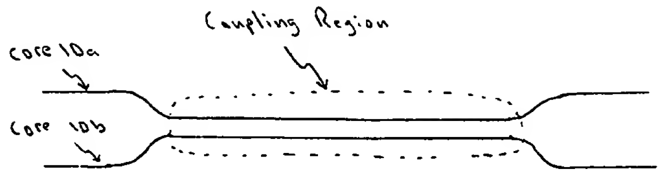


Fig. 3

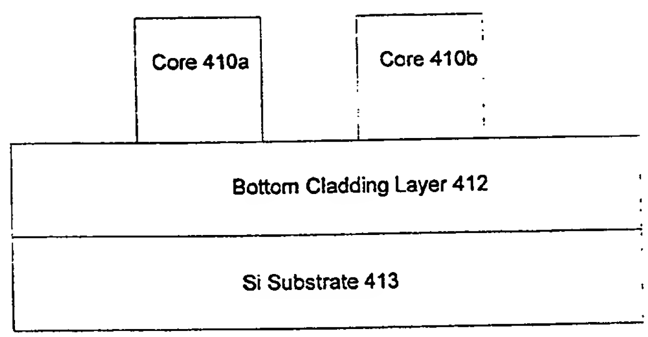

Core 410a
Core 410b
Bottom Cladding Layer 412
Si Substrate 413

FIG. 4

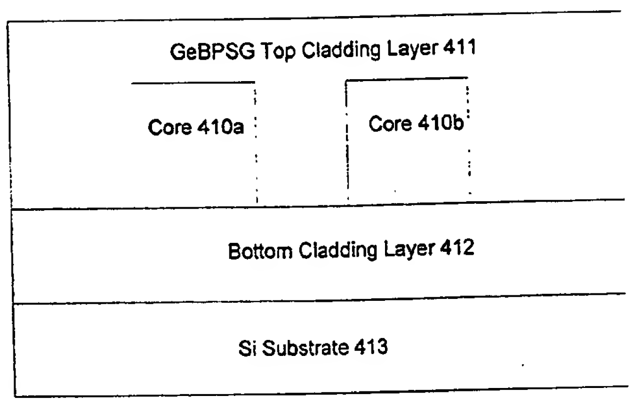
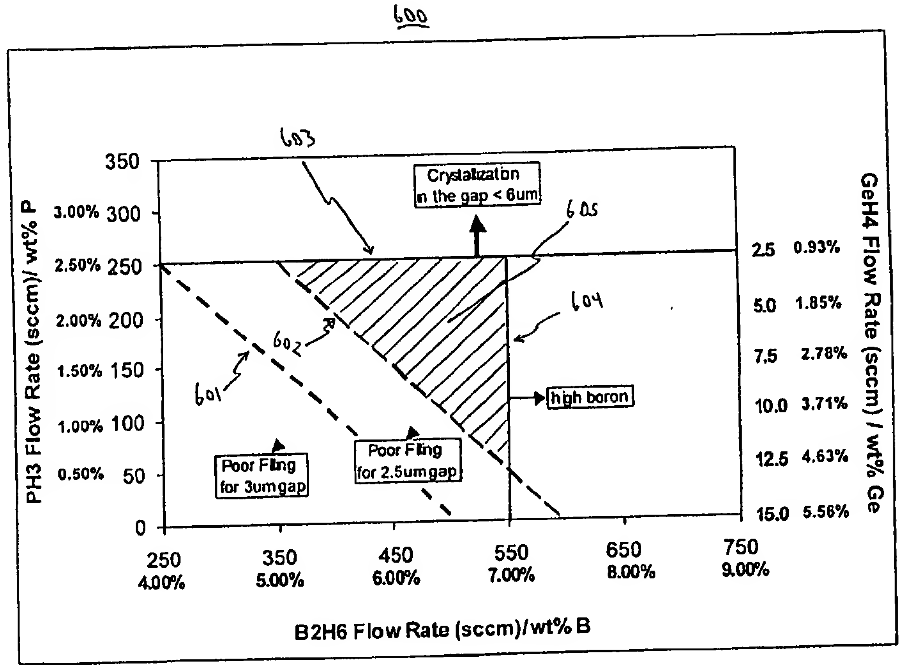

GeBPSG Top Cladding Layer 411
Core 410a
Core 410b
Bottom Cladding Layer 412
Si Substrate 413

FIG. 5



GeBPSG Doping Window

FIG. 6

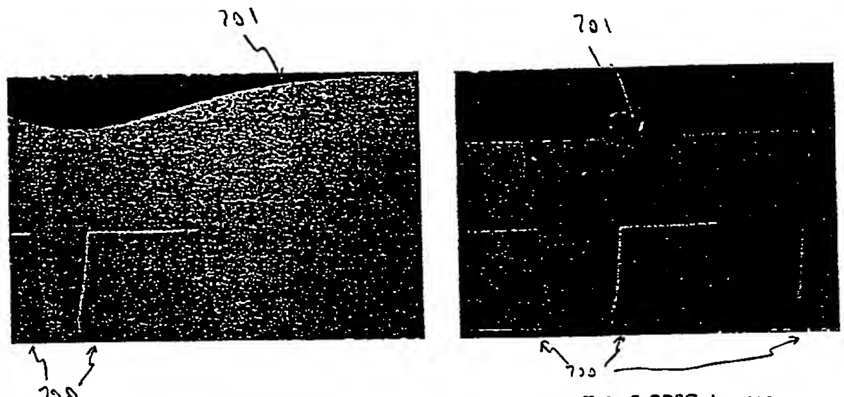
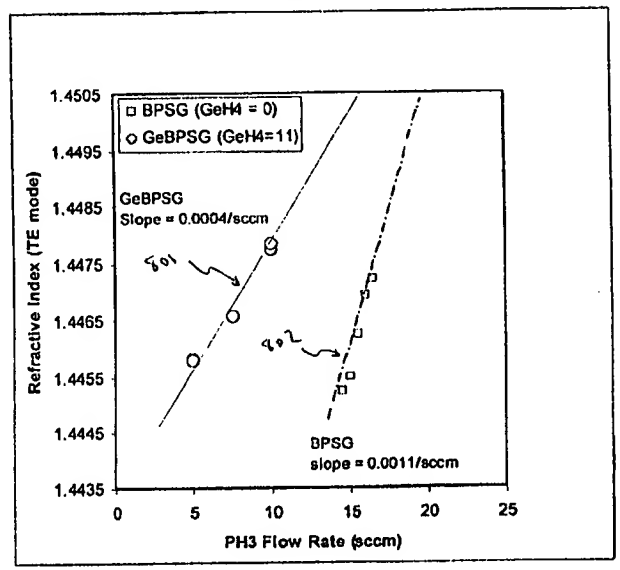


Fig 7 (a) GeBPSG 2um gap

Fig 7 (b) GeBPSG 4um gap

800



Sensitivity of refractive index to PH_3 flow (GeBPSG vs. BPSG)

FIG. 8

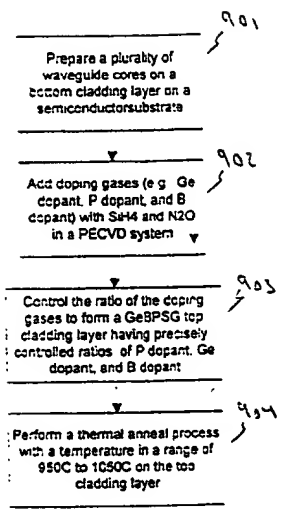

900
901
Prepare a plurality of waveguide cores on a bottom cladding layer on a semiconductorsubstrate
902
Add doping gases (e g Ge dopant, P dopant, and B dopant) with SiH4 and N2O in a PECVD system
903
Control the ratio of the doping gases to form a GeBPSG top cladding layer having precisely controlled ratios of P dopant, Ge dopant, and B dopant
904
Perform a thermal anneal process with a temperature in a range of 950C to 1050C on the top cladding layer

Fig. 9